

Shipping ECAs to cut air pollution

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50,000 deaths/year in Europe

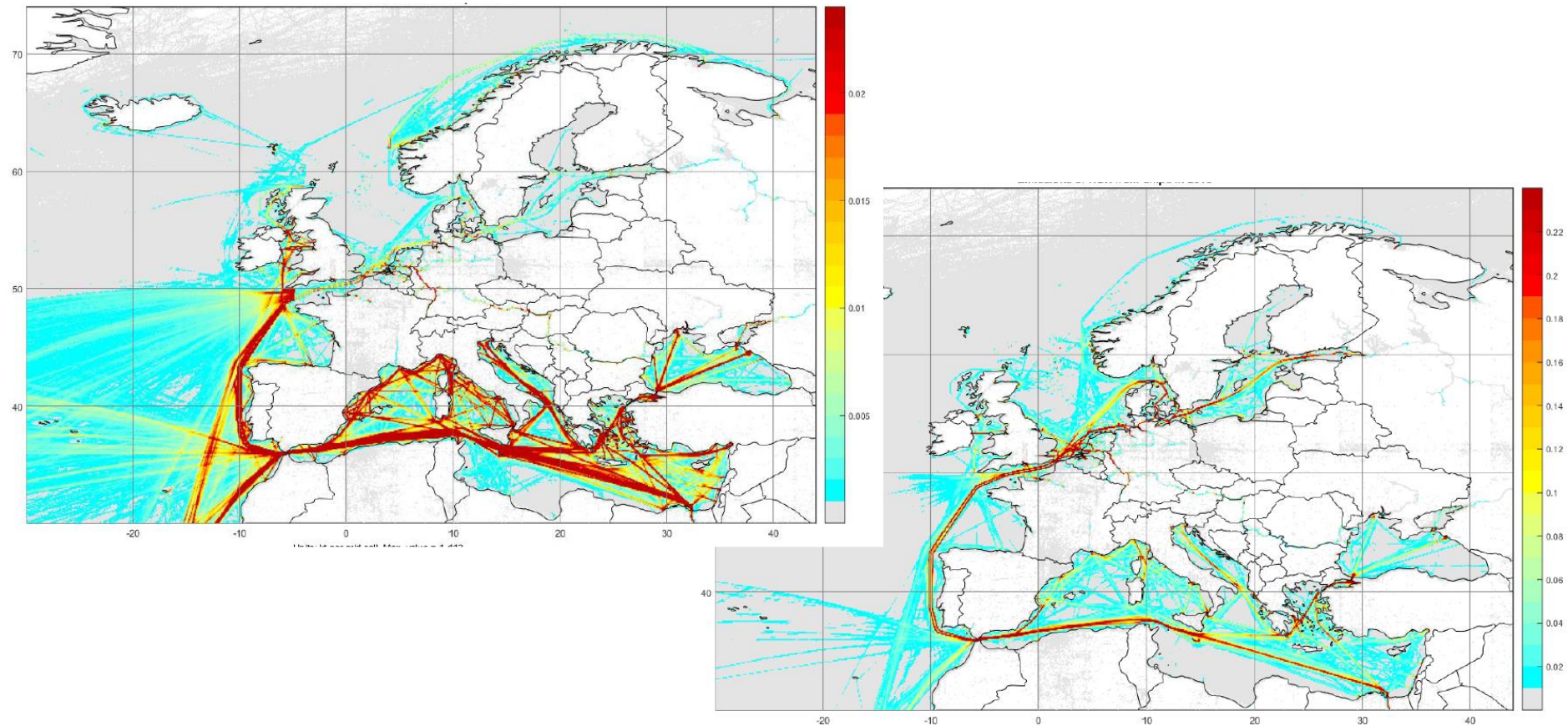
In Europe, emissions from international shipping is responsible for some **50,000 premature deaths** per year due to PM_{2.5}

Ship emissions also contribute to damage to **nature and biodiversity**, and to damage to **materials, incl. our cultural heritage**.



Ship emissions occur close to land

Gridded emissions 2015: At left SO₂ and at right NO_x (thousand tons/grid)

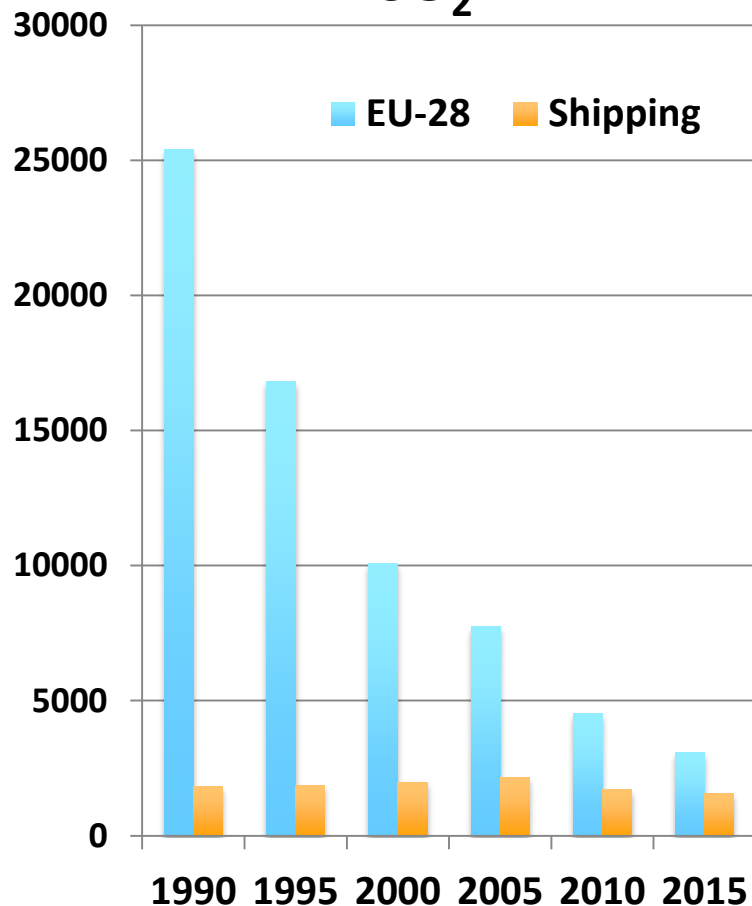


Globally, 70-80% of ship emissions take place within 400 km from shore

Sources: IIASA (2018), ICCT (2007)

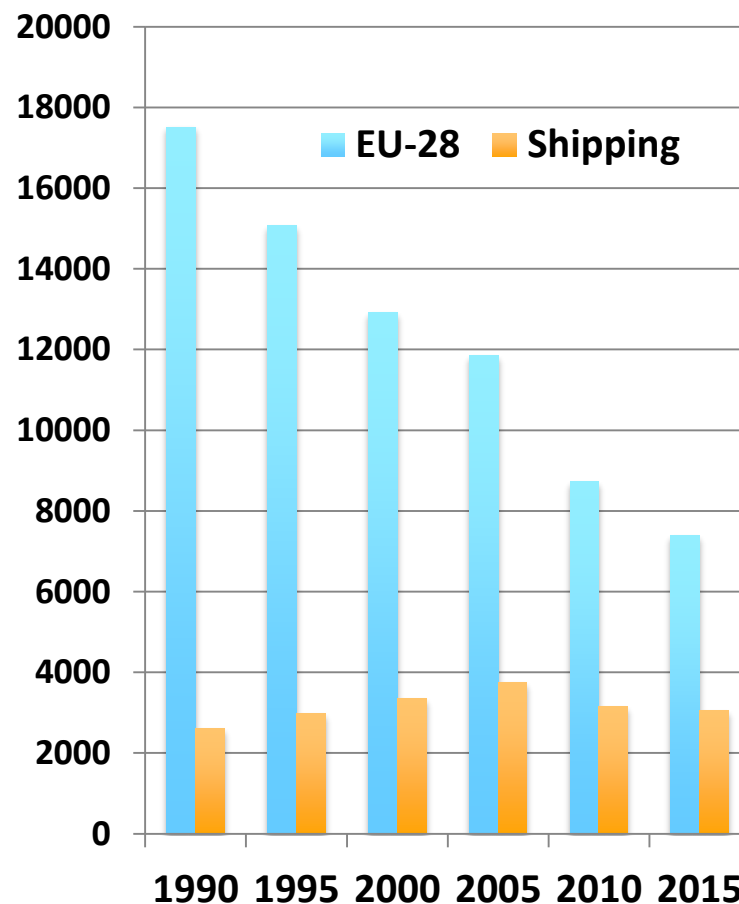
EU28 land-based vs. shipping around Europe 1990-2015 (kton)

SO₂



Land-based SO₂ cut by 89% 1990-2015

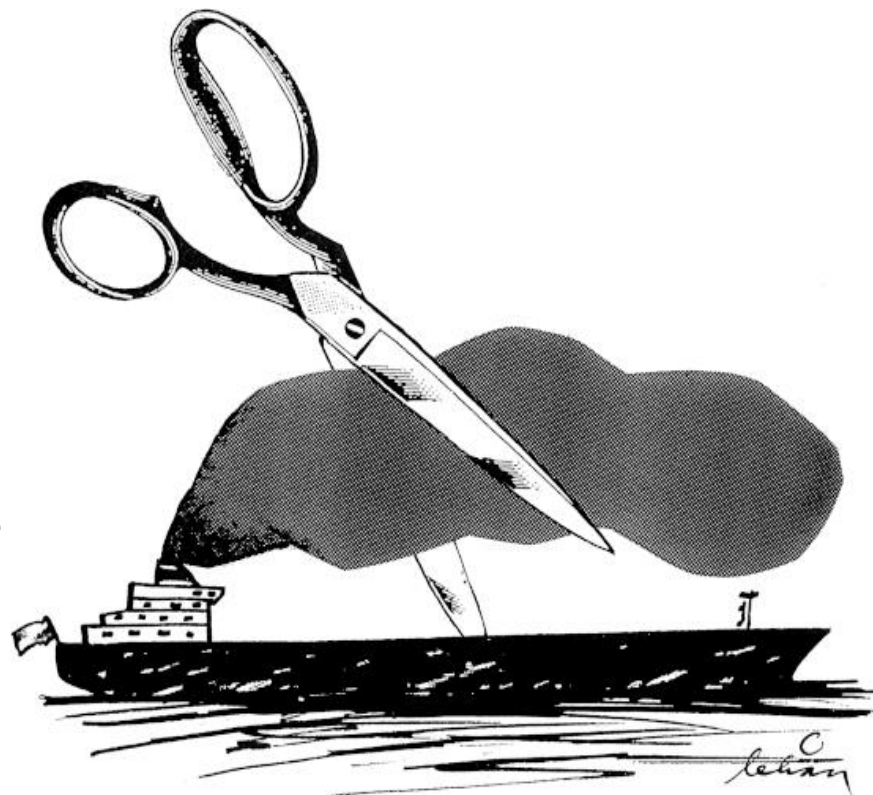
NO_x



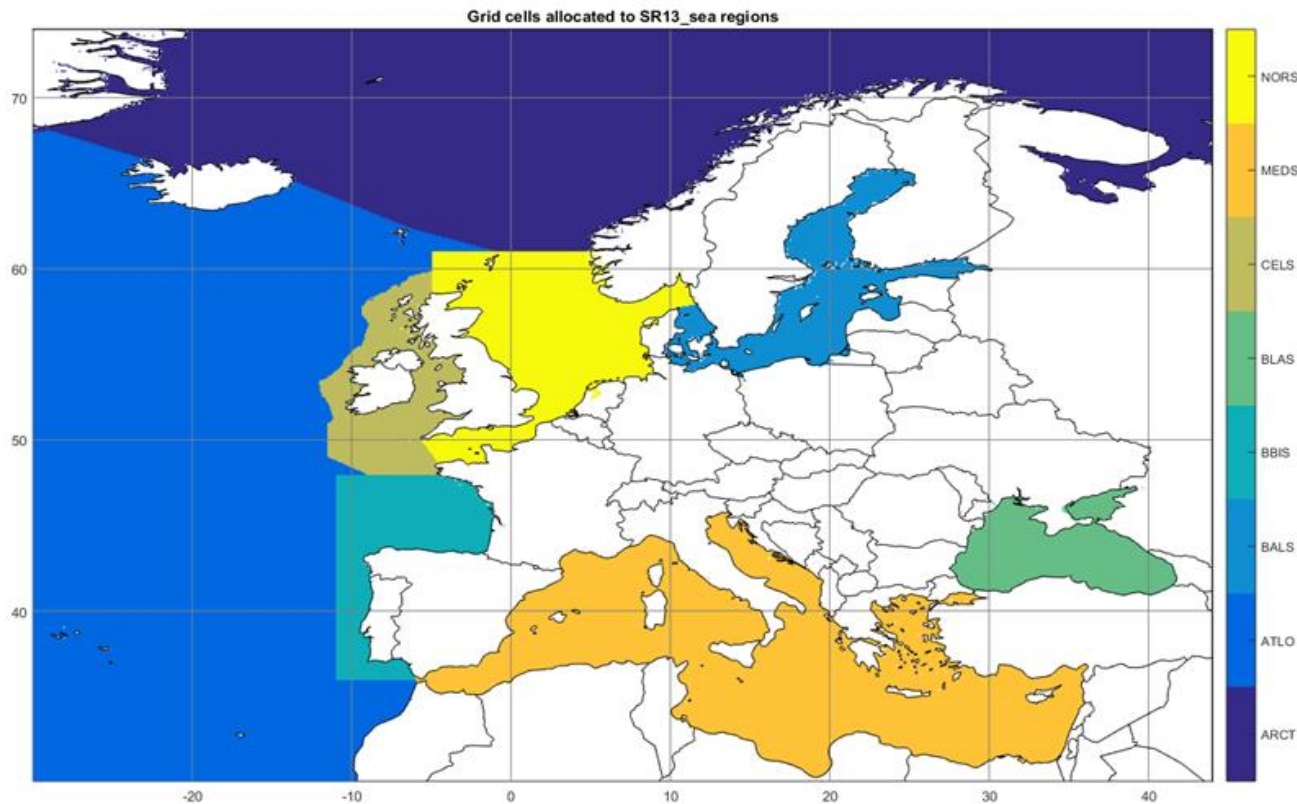
Land-based NO_x cut by 56% 1990-2015

Prescription for an effective ECA

- **Sulphur standard:** 10 ppm
(currently 1000 ppm)
- **NOx standard new ships:** 1-2 g/kWh
(current Tier III: 2-3.4 g/kWh)
- **NOx control existing ships:** Either phase-in of standard (as above) or use of economic instruments
- **PM standard (new & existing ships):**
To be derived from DPF performance
- **Reduced speed**
- **Continuous emissions monitoring**
- **Enforcement**
- **Decarbonisation**



Cover all European seas regions

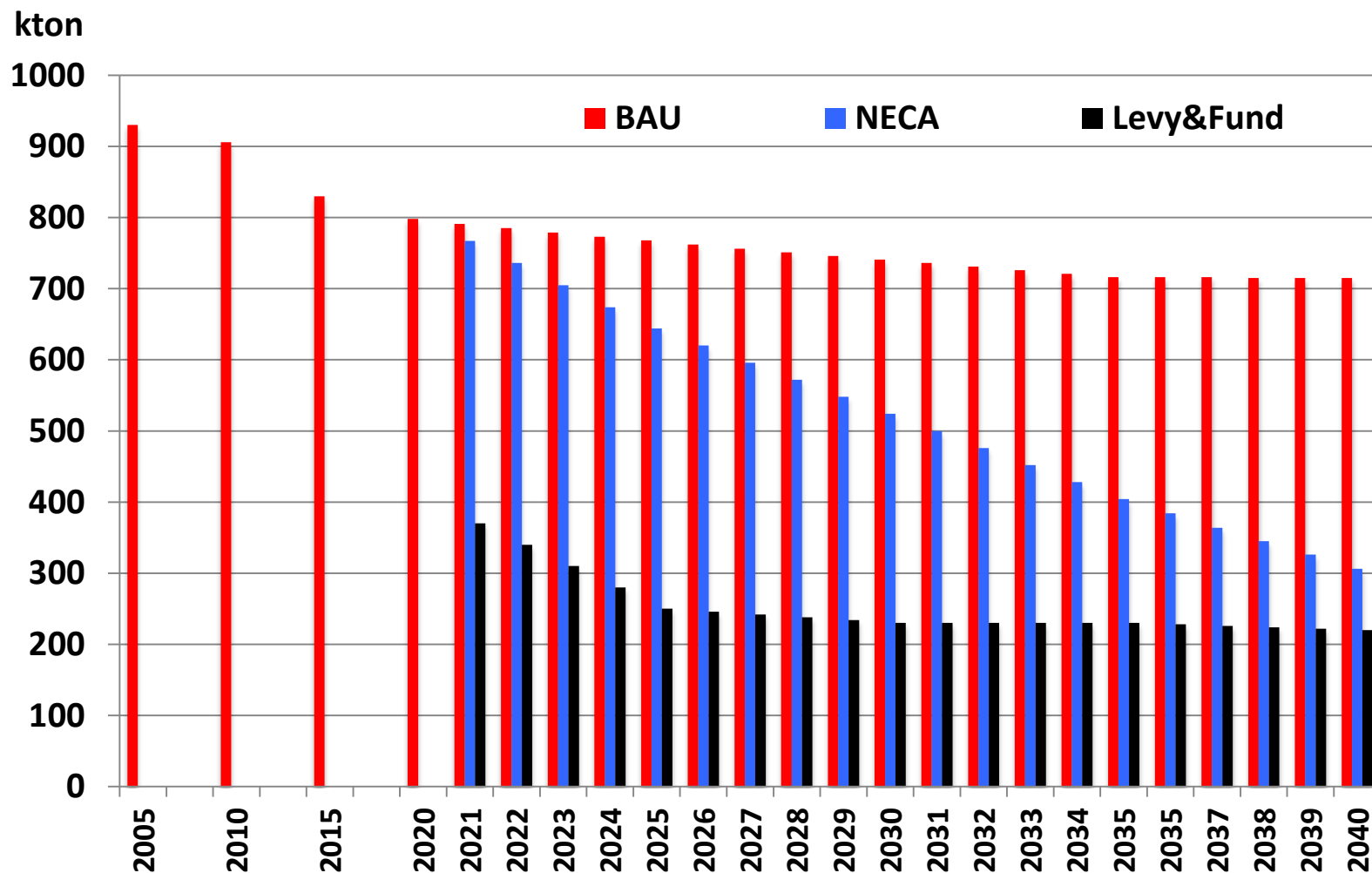


Sea regions:

- Arctic (ARCT)
- Atlantic Ocean (ATLO)
- Baltic Sea (BALS)
- North Sea with English Channel (NORS)
- Celtic Sea (CELS)
- Bay of Biscay (BBIS)
- Mediterranean Sea (MEDS)
- Black Sea (BLAS)

Source: IIASA (March 2018)

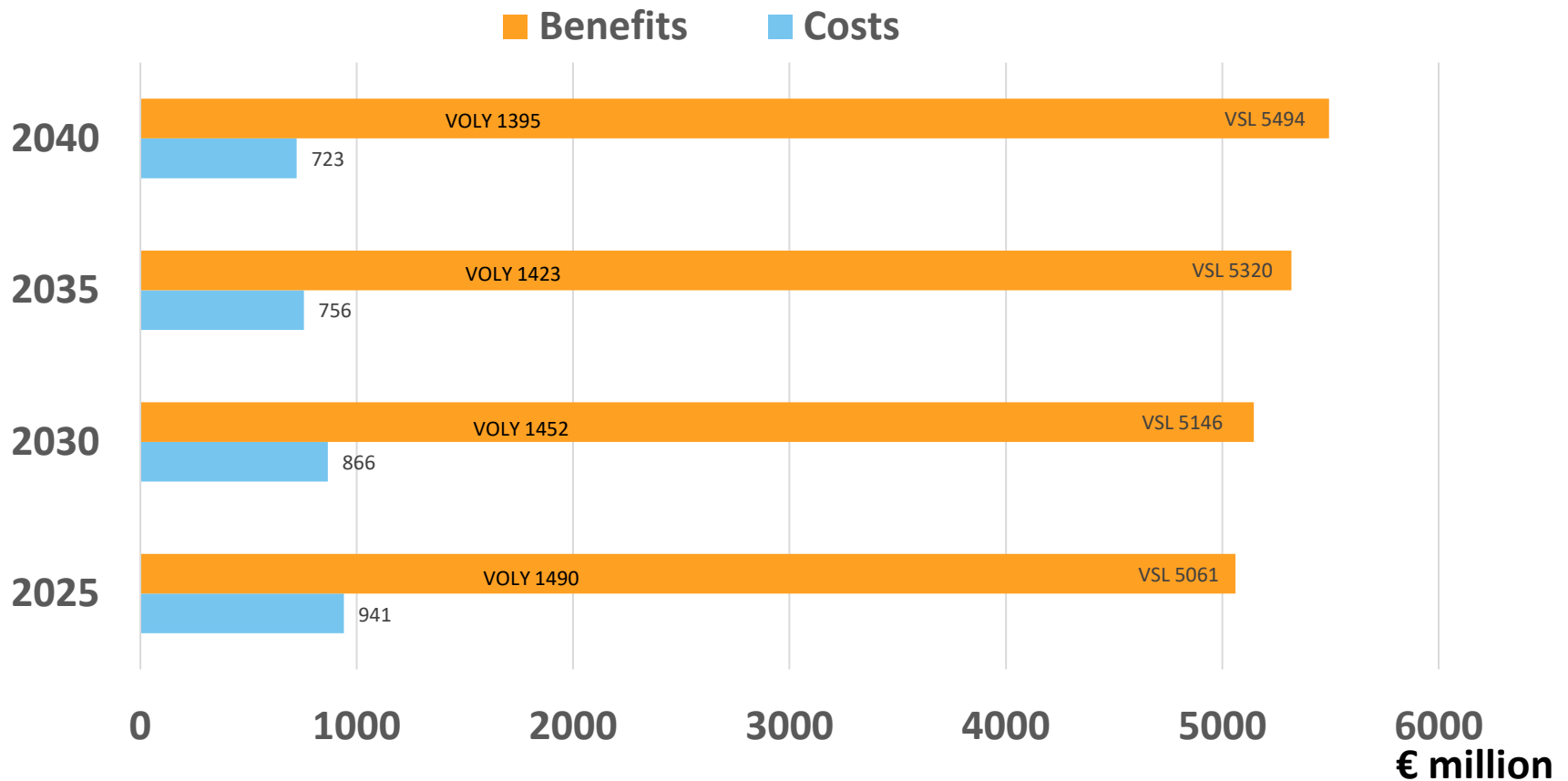
AirClim study on NECA + Levy & Fund for the Baltic Sea and the North Sea



Sources: IVL/CE Delft (2016); IVL (2017)

CBA for NECA + Levy&Fund

NECA + Levy & Fund: Benefits as VSL vs. costs (central valuation)



Source: IVL (2017)



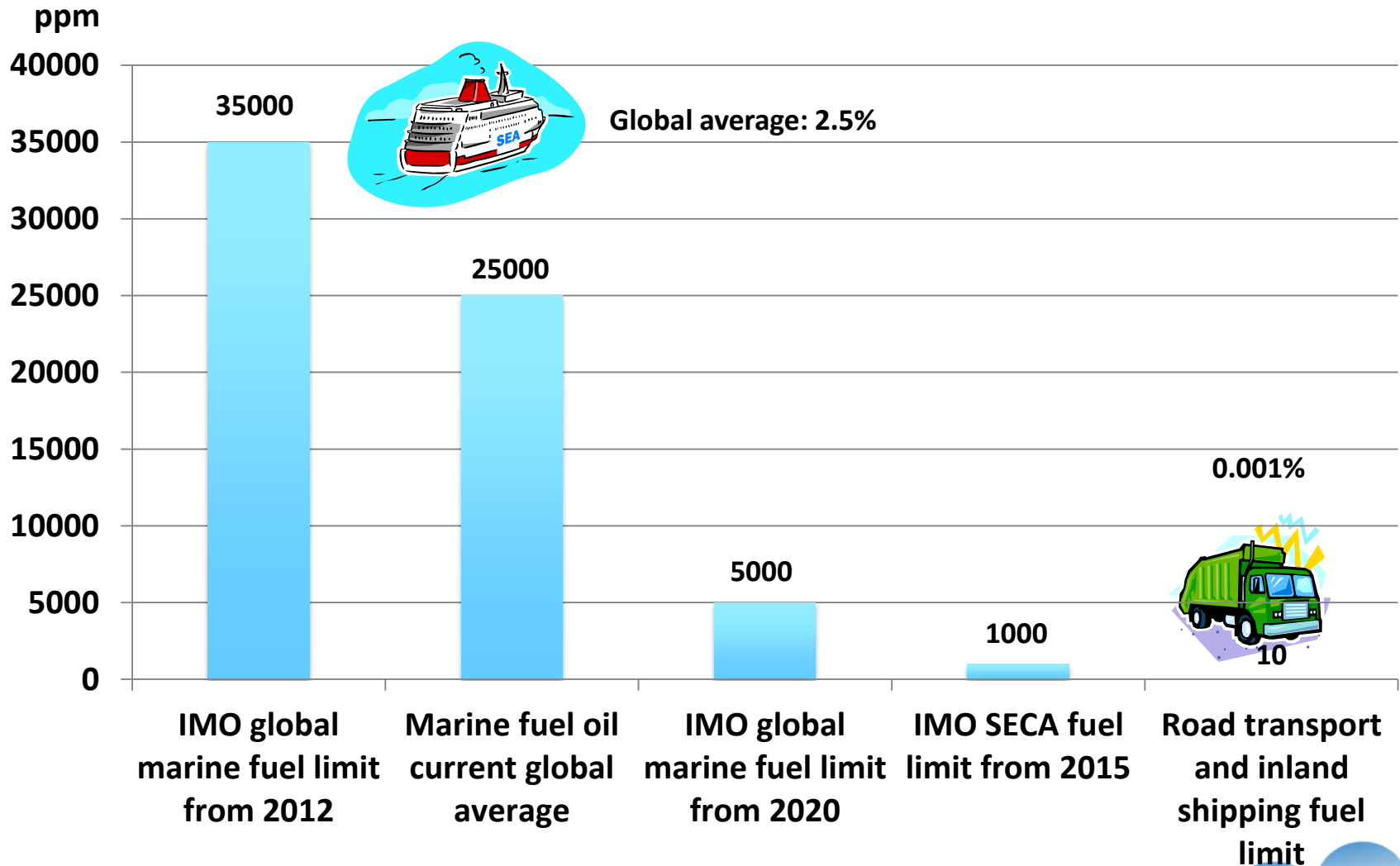
More information?

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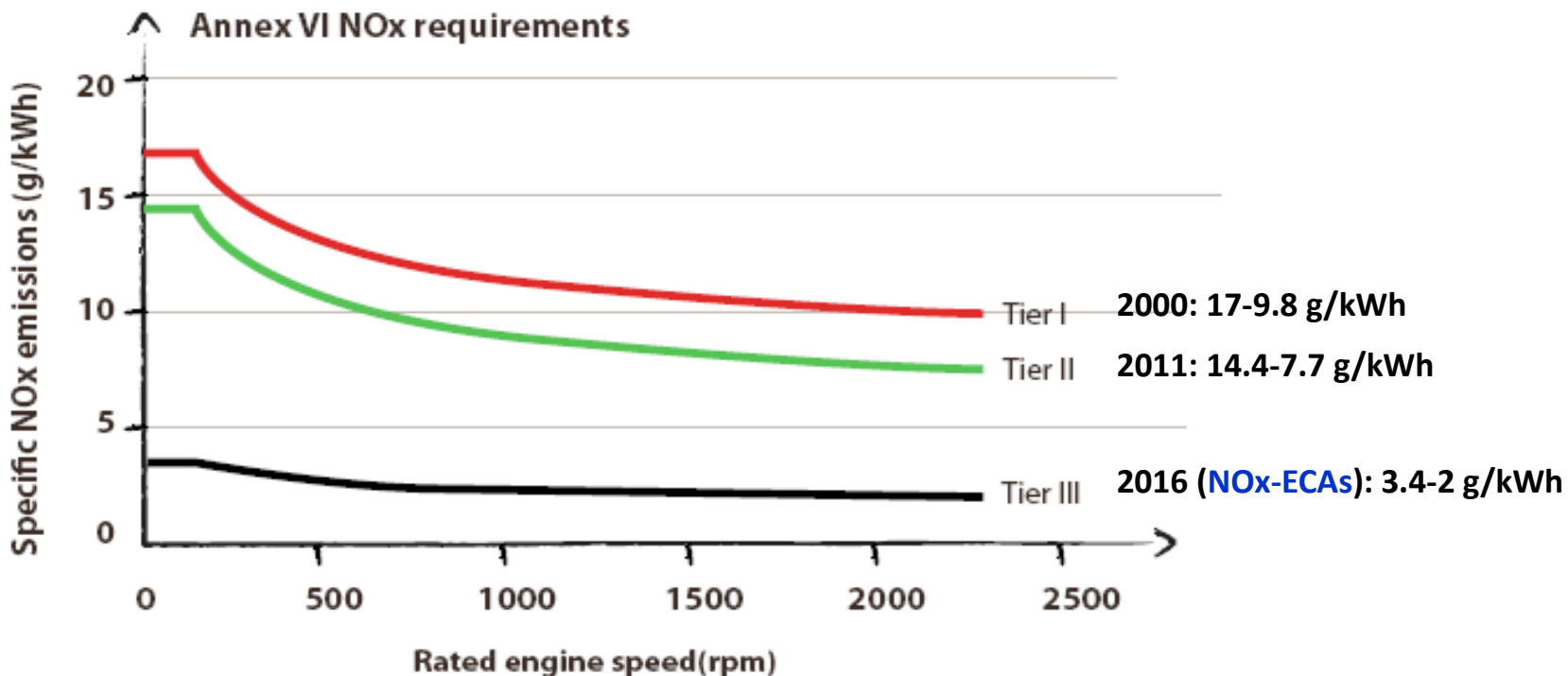
www.airclim.org



Sulphur content of transport fuels



IMO NOx-standards for new ship engines



Compare to EU-standards (Euro VI) for new heavy duty diesel engines in trucks and buses set at **0.4 g/kWh** as from 2013 - down from 8 g/kWh from 1992 (Euro I).

EU28 land-based vs. shipping around Europe 2010-2030 (kton)

